Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SIEGFRIED WOLFF,
RAINER PANENKA, MARINUS HADDEMAN
and HIDENARI NAKAHAMA

Appeal No. 1997-2873
Application 08/417,858

ON BRIEF

Before KIMLIN, WARREN and JEFFREY T. SMITH, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 12, 14 through 31, 33 and 36. Subsequently, claims 13, 32, 34 and 35 were cancelled and claim 24 was withdrawn from consideration by the examiner under 37 CFR § 1.142(b). Thus, claims 1 through 12, 14 through 23, 25 through 31, 33 and 36 remain for consideration on appeal. Claim 1 is illustrative of the claims on appeal:

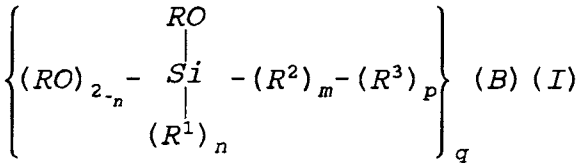
1. A vulcanizable rubber composition comprising

(a) an ethylene-propylene-nonconjugated diene copolymer rubber (EPDM), a sufficient amount of a cross-linking system capable of crossing the rubber,

(b) at least one of the alkoxysilane compounds expressed by the following formula (I) or (II), and

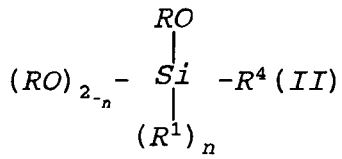
(c) silica and/or silicate powder having a BET specific surface area of 50 to 100 m^2/g;

said formula I is as follows:



where R is an alkyl group having 1 to 4 carbon atoms or an alkoxy group having 1 to 4 carbon atoms; R^1 is an alkyl group having 1 to 4 carbon atoms or phenyl group; n is 0, 1 or 2; R^2 is a divalent straight-chained or branched hydrocarbon radical having 1 to 6 carbon atoms; R^3 is an arylene group having 6 to 12 carbon atoms; m and p are respectively 0 or 1 but not 0 at the same time; q is 1 or 2; and B is –SCN or –SH when q is 1 or B is –Sx– when q is 2, where x is an integer of 2 to 8;

and said formula II is as follows:



where R is an alkyl group having 1 to 4 carbon atoms or an alkoxy group having 1 to 4 carbon atoms; R^1 is an alkyl group having 1 to 4 carbon atoms or phenyl group; n is 0, 1 or 2; R^4 is a monovalent straight-chained or branched unsaturated hydrocarbon radical having 2 to 20 carbon atoms.

The appealed claims, as represented by claim 1, are drawn to a vulcanizable rubber composition comprising at least the ethylene-propylene-nonconjugated diene copolymer rubber (EPDM), a sufficient amount of a crosslinking system capable of crossing the rubber, at least one of the alkoxysilane compounds of the Formula I or II, and silica and/or silicate powder having the specified BET specific surface area. According to appellants, the claimed vulcanizable rubber compositions have properties that make them "suitable for applications such as automobile tires and vibration-proof rubber" (specification, page 1; see also pages 17-19).

The references relied on by the examiner are:

Schrage et al. (Schrage)	3,577,393	May 4, 1971
Yamamoto et al (Yamamoto)	3,674,755	Jul. 4, 1972
Longi et al. (Longi)	3,684,782	Aug. 15, 1972
Thurn et al. (Thurn)	3,873,489	Mar. 25, 1975
Kempermann et al. (Kempermann)	4,003,843	Jan. 18, 1977

The examiner has rejected appealed claims 1 through 12, 14 through 23, 25 through 31, 33 and 36 under 35 U.S.C. § 103 as being unpatentable over Kempermann and as being unpatentable over Kempermann or Thurn combined with applicants' disclosure of prior art at page 15, lines 12-25, of the specification, and Longi, Yamamoto and Schrage[1] (answer, pages 3-4).

Appellants state in their brief (page 7) that the appealed claims "stand or fall together." Thus, we decide this appeal based on appealed claim 1. 37 CFR § 1.192(c)(7) (1995).

We affirm both grounds of rejection.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the examiner's answer and to appellants' brief for a complete exposition thereof.

Opinion

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the examiner that the claimed vulcanizable rubber composition encompassed by appealed claim 1 would have been obvious over the teachings of Kempermann and the combined teachings of Kempermann, Thurn, applicants' disclosure of prior art at page 15, lines 12-25, Longi, Yamamoto and Schrage to one of ordinary skill in this art at the time the claimed invention was made. We find it necessary to our decision to discuss only Kempermann and Thurn. *See In re Kronig*, 539 F.2d 1300, 1302-04, 190 USPQ 425, 426-28 (CCPA 1976).

[1] This ground of rejection is set forth in the answer as applying to claims 14 through 31, 33 and 36 even though all appealed claims, including claims 1 through 12, were so rejected in the final rejection. Since the examiner has not expressly withdrawn this ground of rejection with respect to claims 1 through 12, claims 14 through 31, 33 depend on claim 1, and appellants have briefed this ground with respect to claims 1 through 12, we consider the examiner's failure to include claims 1 through 12 in the statement of the rejection as harmless error. We note again here that the examiner withdrew the grounds of rejection with respect to appealed claim 24, holding the same to be withdrawn from further consideration under 37 CFR § 1.142(b) (*see above* p. 1).

As an initial matter, we find that, when considered in light of the written description in the specification as interpreted by one of ordinary skill in this art, *see, e.g., In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997), the plain language of appealed claim 1 requires that the claimed vulcanizable rubber composition comprise at least the three listed ingredients, that is, any nonconjugated EPDM, any cross-linking system, a specified silica and a specified alkoxysilane, in any amount, wherein the composition can contain other components, *inter alia*, other rubbers, other fillers, softening agents and vulcanization accelerators (specification, e.g., pages 8-9, 12-13, 14, 15-16). *See Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) ("The claimed composition is defined as comprising - meaning containing at least - five specific ingredients."); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) ("As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term 'comprises' permits the *inclusion* of other steps, elements, or materials.").

We have carefully compared the claimed vulcanizable rubber composition encompassed by appealed claim 1 with the disclosures of both Kempermann and Thurn and find that we agree with the examiner that the vulcanizable rubber compositions disclosed in each of these references encompass the claimed vulcanizable rubber composition. Kempermann discloses an accelerator mixture for the sulfur vulcanization of rubber compositions, including "ethylene-propylene terploymers . . . with dienes as the ter component" (col. 2, lines 14-15) that is, EPDM, which include light fillers, including "precipitated silica" (col. 1, lines 67, to col. 2, line 3), wherein the mixture consists of sulfur containing alkoxysilanes that fall within Formula I of appealed claim 1 (col. 2, lines 34-43) as well as thiazole, guanidine and thiuram accelerators (see col. 1, line 14, to col. 2, line 56). Kempermann does not specify whether the EPDM is nonconjugated or the surface area of the precipitated silica. However, we find that one of ordinary skill in the art would have known that nonconjugated EPDM is useful in vulcanizable rubber compositions. We also agree with the examiner that the disclosure of the reference would encompass silica having a surface area within the range specified in appealed claim 1. Indeed, one of ordinary skill in this art would have determined the optimum surface area range for precipitated silica with routine experimentation. *See In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)

("[W]here general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."). Thus, *prima facie*, one of ordinary skill in this art routinely following the teachings of Kempermann would have arrived at the claimed vulcanizable rubber compositions. *See Merck & Co., Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1845-46 (Fed. Cir. 1989); *In re Lemin*, 332 F.2d 839, 841, 141 USPQ 814, 815-16 (CCPA 1964). It is well settled that where the claimed range is encompassed by the range disclosed in the applied prior art, the claimed range will not patentably distinguish the claimed invention from the prior art unless the claimed range is shown to be critical, such as by a showing of a new or unexpected result. Thus, the burden shifts to appellants to establish that the presently claimed compositions achieve a new or unexpected result with respect to the teachings of Kempermann. *See In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1577-78, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990), and cases cited therein.

We find that Thurn discloses the same vulcanizable rubber compositions as Kempermann, except in more detail. Indeed, Thurn discloses examples of nonconjugated EPDM (col. 7, lines 19-25) which can be mixed with other rubbers (col. 7, lines 10-19), examples of additional sulfur containing alkoxysilanes falling within Formula I of appealed claim 1 (e.g., cols. 2-3 and col. 5, lines 45-55), and silica having a preferred BET specific surface area range of 20-400 m^2/g, which can be mixed with other fillers (col. 3, line 66, to col. 5, line 26). The rubber compositions of Thurn can be used for a variety of applications, *inter alia*, vehicle tires and damping elements (col. 8, lines 4-11). Thurn discloses a rubber composition in Example 9 thereof (col. 20, and col. 21, lines 4-24) which contains a "Terpolymer ethylene-propylene-rubber (Keltan 70 of DSM)," "Finely divided, precipitated silica (EXTRUSIL of DEGUSSA)" and "Bis-[3-triethoxylsilyl-propyl]-tetrasulfide," and thus contains an EPDM, silica that has a BET specific surface area of 35 m^2/g as we discuss below, and a sulfur containing alkoxysilane falling in Formula I of appealed claim 1. Other silica exemplified in the Thurn Examples include "Finely divided precipitated silica (ULTRASIL VN 3 of DEGUSSA)" in Example 2, "finely divided precipitated silica and hexanetriol (Aktivator R of DEGUSSA)" in Example 2, and "Finely divided, precipitated silica (ULTRASIL VN 2 of DEGUSSA)" in Example 8. Thurn

discloses that "[t]ypical examples of siliceous fillers usable in the invention, for example, are those produced by Degussa, such as silica or silicates under the tradenames; [sic] Aerosil, Ultrasil, Silteg, Durosil, Extrusil, Calsil, etc." (col. 5, lines 22-25). Thurn further discloses that the BET specific surface area of "Ultrasil VN2" is 130 m^2/g, and of "Utrasil VN3" is 210 m^2/g. Appellants disclose in their specification that the BET specific surface area of "DUROSIL" is 50 m^2/g (pages 22 and 34), of "VN3" is 170 m^2/g (page 22), of "VN2" is 125 m^2/g (page 38), and of "Extrusil" is 35 m^2/g, all of which are identified as products of Degussa AG, stated by appellants to be a co-assignee of the claimed invention on appeal (brief, page 2).

Comparing the information with respect to the BET specific surface area of silica products as disclosed in appellants' specification to the disclosure or Thurn, we find that the silica in the rubber composition of Thurn Example 9 has a BET specific surface area of 35 m^2/g and thus differs in this respect from the claimed compositions wherein the lower limit is 50 m^2/g. However, it is apparent that at least "Durosil," which appears to have a BET specific surface area of 50 m^2/g according to appellants' specification, is among the range of Degussa silica products disclosed by Thurn to be suitable in the rubber compositions disclosed therein. Thus, it is apparent that one of ordinary skill in this art routinely following the disclosure of Thurn, *prima facie*, would have arrived at the claimed vulcanizable rubber compositions. *See Merck v. Biocraft, supra*; *Lemin*, *supra*;. Accordingly, the burden shifts to appellants to establish that the presently claimed compositions achieve a new or unexpected result with respect to the teachings of Thurn on the authority we cite above.

Accordingly, since a *prima facie* case of obviousness has been established over the applied prior art by the examiner, we have again evaluated all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments and the evidence in the specification. *See generally, In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); *In re Rinehart*, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We have again considered the teachings of Kempermann and of Thurn in view of appellants' arguments based on the more generic disclosure of the former (brief, pages 9-12 and

14) and the range of BET specific surface area disclosed in the latter (id., pages 26-28), and while we agree with appellants that neither reference contains an anticipatory disclosure, we find it difficult to accept appellants' contention that one of ordinary skill in this art would not have been led by either of these references to the claimed compositions because there is no disclosure that the properties appellants' ascribe to the claimed compositions would have been obtained with the specific ingredients which the claimed compositions must at least comprise. Indeed, both references provide the clear suggestion that vulcanizable compositions prepared according to the teachings thereof will provide rubber with desirable properties as expected from the teachings thereof. The fact that neither reference describes the compositions disclosed therein using all of the properties disclosed as desirable by appellants does not patentably distinguish the references in the absence of a showing of the criticality of the claimed BET specific surface area range. *See, In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 82 (CCPA 1975).

In this respect, we have carefully considered the evidence relied upon by appellants as expressed in the combinations of specification Examples and specification Comparative Examples (specification, pages 22-33 and 38-43) presented in the brief (pages 26-35). We are not persuaded by this evidence that the claimed vulcanizable rubber compositions encompassed by appealed claim 1 are patentable over Kempermann and Thurn for several reasons. The comparisons on pages 16 and 18 of the brief do not reflect the thrust of the rejection over the references. *See, e.g., In re In re Burckel*, 592 F.2d 1175, 1179-80, 201 USPQ 67, 71 (CCPA 1979) (the claimed subject matter must be compared with the closest prior art in a manner which addresses the thrust of the rejection). The comparison of Example 4 with Comparative Example 5 (brief, page 16) involves two compositions that contain the same alkoxysilane falling within Formula I of appealed claim 1 but differ in that the EPDM of Example 4 has a Mooney viscosity of 45 while the EPDM of Comparative Example 5 has a Mooney viscosity of 20 (see page 8 and Table 1 on page 2 of the specification). Because there is *no* limitation on the EPDM which can be used in the compositions of appealed claim 1, the composition of Comparative Example 5 falls within appealed claim 1. In the comparison of Examples 1, 2 and 3 with Comparative Example 1 (brief, page 18), the Comparative Example simply does not reflect the teachings of

Kempermann and Thurn because each of these references disclose compositions that contain a sulfur containing alkoxysilane and silica along with a EPDM.

Furthermore, the comparisons between an Example and a Comparative Examples on pages 17 and 19-24 (Examples 1, 2, and 3, each combined with a different two of Comparative Examples 2, 3, 4, 7, 8, and 9, with the comparison of the Examples with Comparative Examples 7, 8, and 9 summarized on page 24), all differ in the amount of the sulfur containing alkoxysilane and in the BET specific surface area of the silica ingredient. The difference with respect to the amount of the alkoxysilane is 1:3 in each comparison with the Comparative Examples being the higher number, and with respect to BET, the silica of each of the Examples is 50 m^2/g while that of Comparative Examples 2, 3 and 4 is 170 m^2/g and of Comparative Examples 7, 8 and 9 is 125 m^2/g. In the comparison between the specification Example and the specification Comparative Example of page 42 of the specification (brief, page 25), wherein a particular mixing procedure was employed (compare pages 23-24 with pages 40-41 of the specification), the difference in the amount of the sulfur containing alkoxysilane is 3:2 , with the Example the higher number, and the difference in BET is 50 m^2/g : 35 m^2/g, with the Example again the higher number. We note that in the latter comparison, the rubber is "Buna AP 451," an "ethylene-propylene-diene rubber" (specification, page 34), while in the prior comparisons, the rubber is "ethylene-propylene-5-ethylidene-2-norbornene" which is disclosed to provide "most excellent results" (specification, pages 7 and 22).

There is no doubt that from the data reported that the compositions of Examples 1-3 out-performed those of the Comparative Examples in the properties tested. However, we fail to find in the record any evidence or scientific explanation of the practical significance of these results with respect to the criticality of the difference in the BET specific surface area of the silica in view of the large difference in BET between the Examples 1-3 at the low end of the claimed BET range and the Comparative Examples that are significantly above the high end of the claimed BET range, and the additional difference in the amount of sulfur containing alkoxysilane. It is well settled that the burden of establishing the practical significance of data in the record with respect to unexpected results rests with appellants, which burden is not carried by mere arguments of counsel. *See generally, In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362,

1365-66 (Fed. Cir. 1997); *In re Merck & Co.*, 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir. 1986); *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985); *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972); *In re D'Ancicco*, 439 F.2d 1244, 1248, 169 USPQ 303, 306 (CCPA 1971).

In the absence of such evidence or explanation, we find that the evidence is not based on comparisons of the claimed compositions and the closest prior art which would establish the criticality of the BET range specified in appealed claim 1. Indeed, we find no comparison based on the composition of Thurn Example 9, which appears to differ solely in that the silica employed therein has a BET of 35 m^2/g. The comparison provided by the Example and Comparative Example of page 42 of the specification does not serve this purpose because it is not apparent that the rubber is the same and there are differences in the method of mixing as well as in other ingredients, none of which is excluded by appealed claim 1. *See Geisler, supra*.

We further find from our analysis that while the reported data establishes an advantage for the claimed compositions in the individual comparisons, this evidence does not provide a reasonable basis on which to conclude that the remainder of the enormous number of vulcanizable rubber compositions encompassed by appealed claim 1 would behave in the same manner with respect to the great number of compositions taught by Kempermann and Thurn, which include compositions that fall within the BET range specified in appealed claim 1. Thus, with respect to the criticality of the BET range, the evidence is not commensurate in scope with the appealed claims. *See, e.g.*, *In re Clemens*, 622 F.2d 1029, 1035-36, 206 USPQ 289, 295-96 (CCPA 1980); *In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978) *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972).

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the teachings of Kempermann and the combined teachings of Kempermann, Thurn, applicants' disclosure of prior art at page 15, lines 12-25, Longi, Yamamoto and Schrage with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 through 12, 14 through 31, 33 and 36, would have been obvious as a matter of law under 35 U.S.C. § 103.

The examiner's decision is affirmed

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN Administrative Patent Judge	)	
CHARLES F. WARREN Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JEFFREY T. SMITH Administrative Patent Judge	)	

Beveridge DeGrandi Weilacher & Young
Suite 800
1850 M Street NW
Washington, DC 20036